

10/534774

JC06 Rec'd PCT/PTO 13 MAY 2005

seq listing.txt

SEQUENCE LISTING

<110> BRETT, Sara  
HAMBLIN, Paul A.  
OGILVIE, Louise

<120> Vaccine

<130> VB60547

<140> Not Yet Assigned  
<141> 2005-05-13

<150> PCT/EP03/12793  
<151> 2003-11-13

<150> GB 0226422.7  
<151> 2002-11-15

<160> 24

<170> FastSEQ for Windows Version 4.0

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<213> Hepatitis C virus

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<213> Hepatitis C virus

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<212> DNA  
<213> Hepatitis C virus

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<210> 6  
<211> 46

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<212> DNA

<213> Hepatitis C virus

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<213> Hepatitis C virus

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<210> 9

<211> 191

<212> PRT

<213> Hepatitis C virus

<400> 9

Met Ser Thr Asn Pro Lys Pro Gln Arg Lys Thr Lys Arg Asn Thr Asn

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Arg Arg Pro Gln Asp Val Lys Phe Pro Gly Gly Gln Ile Val Gly

20 25 30

Gly Val Tyr Leu Leu Pro Arg Arg Gly Pro Arg Leu Gly Val Arg Ala

35 40 45

Thr Arg Lys Thr Ser Glu Arg Ser Gln Pro Arg Gly Arg Arg Gln Pro

50 55 60

Ile Pro Lys Ala Arg Arg Pro Glu Gly Arg Ala Trp Ala Gln Pro Gly

65 70 75 80

Tyr Pro Trp Pro Leu Tyr Gly Asn Glu Gly Leu Gly Trp Ala Gly Trp

85 90 95

Leu Leu Ser Pro Arg Gly Ser Arg Pro Ser Trp Gly Pro Thr Asp Pro

100 105 110

Arg Arg Arg Ser Arg Asn Leu Gly Lys Val Ile Asp Thr Leu Thr Cys

115 120 125

Gly Phe Ala Asp Leu Met Gly Tyr Ile Pro Leu Val Gly Ala Pro Leu

130 135 140

Gly Gly Ala Ala Arg Ala Leu Ala His Gly Val Arg Val Leu Glu Asp

145 150 155 160

Gly Val Asn Tyr Ala Thr Gly Asn Leu Pro Gly Cys Ser Phe Ser Ile

165 170 175

Phe Leu Leu Ala Leu Leu Ser Cys Leu Thr Ile Pro Ala Ser Ala

180 185 190

<210> 10

<211> 632

<212> PRT

<213> Hepatitis C virus

<400> 10

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1 5 10 15

Cys Ile Ile Thr Ser Leu Thr Gly Arg Asp Lys Asn Gln Val Glu Gly

20 25 30

Glu Val Gln Val Val Ser Thr Ala Thr Gln Ser Phe Leu Ala Thr Cys

35 40 45

Ile Asn Gly Val Cys Trp Thr Val Tyr His Gly Ala Gly Ser Lys Thr

50 55 60

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Leu Ala Gly Pro Lys Gly Pro Ile Thr Gln Met Tyr Thr Asn Val Asp  
65 70 75 80  
Gln Asp Leu Val Gly Trp Gln Ala Pro Pro Gly Ala Arg Ser Met Thr  
85 90 95  
Pro Cys Thr Cys Gly Ser Ser Asp Leu Tyr Leu Val Thr Arg His Ala  
100 105 110  
Asp Val Ile Pro Val Arg Arg Gly Asp Ser Arg Gly Ser Leu Leu  
115 120 125  
Ser Pro Arg Pro Val Ser Tyr Leu Lys Gly Ser Val Gly Gly Pro Leu  
130 135 140  
Leu Cys Pro Ser Gly His Val Val Gly Ile Phe Arg Ala Ala Val Cys  
145 150 155 160  
Thr Arg Gly Val Ala Lys Ala Val Asp Phe Ile Pro Val Glu Ser Met  
165 170 175  
Glu Thr Thr Met Arg Ser Pro Val Phe Thr Asp Asn Ser Ser Pro Pro  
180 185 190  
Ala Val Pro Gln Thr Phe Gln Val Ala His Leu His Ala Pro Thr Gly  
195 200 205  
Ser Gly Lys Ser Thr Lys Val Pro Ala Ala Tyr Ala Ala Gln Gly Tyr  
210 215 220  
Lys Val Leu Val Leu Asn Pro Ser Val Ala Ala Thr Leu Gly Phe Gly  
225 230 235 240  
Ala Tyr Met Ser Lys Ala His Gly Ile Asp Pro Asn Ile Arg Thr Gly  
245 250 255  
Val Arg Thr Ile Thr Thr Gly Ala Pro Ile Thr Tyr Ser Thr Tyr Gly  
260 265 270  
Lys Phe Leu Ala Asp Gly Gly Cys Ser Gly Gly Ala Tyr Asp Ile Ile  
275 280 285  
Ile Cys Gln Glu Cys His Ser Thr Asp Ser Thr Thr Ile Leu Gly Ile  
290 295 300  
Gly Thr Val Leu Asp Gln Ala Glu Thr Ala Gly Ala Arg Leu Val Val  
305 310 315 320  
Leu Ala Thr Ala Thr Pro Pro Gly Ser Val Thr Val Pro His Pro Asn  
325 330 335  
Ile Glu Glu Val Ala Leu Ser Asn Asn Gly Glu Ile Pro Phe Tyr Gly  
340 345 350  
Lys Ala Ile Pro Ile Glu Ala Ile Lys Gly Gly Arg His Leu Ile Phe  
355 360 365  
Cys His Ser Lys Lys Lys Cys Asp Glu Leu Ala Ala Lys Leu Ser Gly  
370 375 380  
Leu Gly Leu Asn Ala Val Ala Tyr Tyr Arg Gly Leu Asp Val Ser Val  
385 390 395 400  
Ile Pro Thr Ser Gly Asp Val Val Val Val Ala Thr Asp Ala Leu Met  
405 410 415  
Thr Gly Phe Thr Gly Asp Phe Asp Ser Val Ile Asp Cys Asn Thr Cys  
420 425 430  
Val Thr Gln Thr Val Asp Phe Ser Leu Asp Pro Thr Phe Thr Ile Glu  
435 440 445  
Thr Thr Thr Val Pro Gln Asp Ala Val Ser Arg Ser Gln Arg Arg Gly  
450 455 460  
Arg Thr Gly Arg Gly Arg Ser Gly Ile Tyr Arg Phe Val Thr Pro Gly  
465 470 475 480  
Glu Arg Pro Ser Gly Met Phe Asp Ser Ser Val Leu Cys Glu Cys Tyr  
485 490 495  
Asp Ala Gly Cys Ala Trp Tyr Glu Leu Thr Pro Ala Glu Thr Ser Val  
500 505 510  
Arg Leu Arg Ala Tyr Leu Asn Thr Pro Gly Leu Pro Val Cys Gln Asp  
515 520 525  
His Leu Glu Phe Trp Glu Ser Val Phe Thr Gly Leu Thr His Ile Asp  
530 535 540  
Ala His Phe Leu Ser Gln Thr Lys Gln Ala Gly Asp Asn Phe Pro Tyr  
545 550 555 560  
Leu Val Ala Tyr Gln Ala Thr Val Cys Ala Arg Ala Gln Ala Pro Pro  
565 570 575  
Pro Ser Trp Asp Gln Met Trp Lys Cys Leu Ile Arg Leu Lys Pro Thr  
580 585 590  
Leu His Gly Pro Thr Pro Leu Leu Tyr Arg Leu Gly Ala Val Gln Asn  
595 600 605

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Glu Val Thr Leu Thr His Pro Ile Thr Lys Tyr Ile Met Ala Cys Met  
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Ser Ala Asp Leu Glu Val Val Thr  
625 630

<210> 11  
<211> 214  
<212> PRT  
<213> Hepatitis C virus

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Met Ala Phe Thr Ala Ser Ile Thr Ser Pro Leu Thr Thr Gln Asn Thr  
35 40 45  
Leu Leu Phe Asn Ile Leu Gly Gly Trp Val Ala Ala Gln Leu Ala Pro  
50 55 60  
Pro Ser Ala Ala Ser Ala Phe Val Gly Ala Gly Ile Ala Gly Ala Ala  
65 70 75 80  
Val Gly Ser Ile Gly Leu Gly Lys Val Leu Val Asp Ile Leu Ala Gly  
85 90 95  
Tyr Gly Ala Gly Val Ala Gly Ala Leu Val Ala Phe Lys Val Met Ser  
100 105 110  
Gly Glu Val Pro Ser Thr Glu Asp Leu Val Asn Leu Leu Pro Ala Ile  
115 120 125  
Leu Ser Pro Gly Ala Leu Val Val Gly Val Val Cys Ala Ala Ile Leu  
130 135 140  
Arg Arg His Val Gly Pro Gly Glu Gly Ala Val Gln Trp Met Asn Arg  
145 150 155 160  
Leu Ile Ala Phe Ala Ser Arg Gly Asn His Val Ser Pro Thr His Tyr  
165 170 175  
Val Pro Glu Ser Asp Ala Ala Ala Arg Val Thr Gln Ile Leu Ser Ser  
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Asp Cys Ser Thr Pro Cys  
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<210> 12  
<211> 592  
<212> PRT  
<213> Hepatitis C virus

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Arg His His Asn Met Val Tyr Ala Thr Thr Ser Arg Ser Ala Ser Leu  
35 40 45  
Arg Gln Lys Lys Val Thr Phe Asp Arg Leu Gln Val Leu Asp Asp His  
50 55 60  
Tyr Arg Asp Val Leu Lys Glu Met Lys Ala Lys Ala Ser Thr Val Lys  
65 70 75 80  
Ala Lys Leu Leu Ser Ile Glu Glu Ala Cys Lys Leu Thr Pro Pro His  
85 90 95  
Ser Ala Lys Ser Lys Phe Gly Tyr Gly Ala Lys Asp Val Arg Asn Leu  
100 105 110  
Ser Ser Arg Ala Val Asn His Ile Arg Ser Val Trp Glu Asp Leu Leu  
115 120 125  
Glu Asp Thr Glu Thr Pro Ile Asp Thr Thr Ile Met Ala Lys Ser Glu  
130 135 140  
Val Phe Cys Val Gln Pro Glu Lys Gly Gly Arg Lys Pro Ala Arg Leu  
145 150 155 160

seq listing.txt

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			195			200			205						
Trp	Lys	Ser	Lys	Lys	Cys	Pro	Met	Gly	Phe	Ser	Tyr	Gly	Thr	Arg	Cys
	210				215				220						
Phe	Gly	Ser	Thr	Val	Thr	Glu	Ser	Asp	Ile	Arg	Val	Glu	Glu	Ser	Ile
	225				230				235			240			
Tyr	Gln	Cys	Cys	Asp	Leu	Ala	Pro	Glu	Ala	Arg	Gln	Ala	Ile	Arg	Ser
			245					250			255				
Leu	Thr	Glu	Arg	Leu	Tyr	Ile	Gly	Gly	Pro	Leu	Thr	Asn	Ser	Lys	Gly
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		275				280			285						
Ser	Cys	Gly	Asn	Thr	Leu	Thr	Cys	Tyr	Leu	Lys	Ala	Thr	Ala	Ala	Cys
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Leu	Val	Val	Ile	Cys	Glu	Ser	Ala	Gly	Thr	Gln	Glu	Asp	Ala	Ala	Ala
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Leu	Arg	Ala	Phe	Thr	Glu	Ala	Met	Thr	Arg	Tyr	Ser	Ala	Pro	Pro	Gly
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Asp	Pro	Pro	Gln	Pro	Glu	Tyr	Asp	Leu	Glu	Leu	Ile	Thr	Ser	Cys	Ser
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Ser	Asn	Val	Ser	Val	Ala	His	Asp	Ala	Ser	Gly	Lys	Arg	Val	Tyr	Tyr
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Ala	Arg	His	Thr	Pro	Val	Asn	Ser	Trp	Leu	Gly	Asn	Ile	Ile	Met	Tyr
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Ala	Pro	Thr	Leu	Trp	Ala	Arg	Met	Ile	Leu	Met	Thr	His	Phe	Phe	Ser
			420				425			430					
Ile	Leu	Leu	Ala	Gln	Glu	Gln	Leu	Glu	Lys	Ala	Leu	Asp	Cys	Gln	Ile
			435				440			445					
Tyr	Gly	Ala	Cys	Tyr	Ser	Ile	Glu	Pro	Leu	Asp	Leu	Pro	Gln	Ile	Ile
			450				455			460					
Glu	Arg	Leu	His	Gly	Leu	Ser	Ala	Phe	Ser	Leu	His	Ser	Tyr	Ser	Pro
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Gly	Glu	Ile	Asn	Arg	Val	Ala	Ser	Cys	Leu	Arg	Lys	Leu	Gly	Val	Pro
			485					490			495				
Pro	Leu	Arg	Val	Trp	Arg	His	Arg	Ala	Arg	Ser	Val	Arg	Ala	Lys	Leu
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Leu	Ser	Gln	Gly	Gly	Arg	Ala	Ala	Thr	Cys	Gly	Arg	Tyr	Leu	Phe	Asn
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Gln	Leu	Asp	Leu	Ser	Gly	Trp	Phe	Val	Ala	Gly	Tyr	Ser	Gly	Gly	Asp
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<210> 13

<211> 15

<212> PRT

<213> Hepatitis C virus

<400> 13

Pro Arg Phe Gly Lys Ala Ile Pro Ile Glu Ala Ile Lys Gly Gly  
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<210> 14

<211> 15

seq listing.txt

<212> PRT

<213> Hepatitis C virus

<400> 14

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<210> 15

<211> 15

<212> PRT

<213> Hepatitis C virus

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<210> 16

<211> 15

<212> PRT

<213> Hepatitis C virus

<400> 16

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<210> 17

<211> 15

<212> PRT

<213> Hepatitis C virus

<400> 17

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<210> 18

<211> 15

<212> PRT

<213> Hepatitis C virus

<400> 18

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<211> 9595

<212> DNA

<213> Hepatitis C virus

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seq listing.txt

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tgacagg	cgtt	gctgtgt	agaaga	atgt	ccgc	4620
cgcctat	agacgt	gtcg	aaat	gac	caaag	4680
atttgact	gtgt	acgt	gtgt	gtac	ttcag	4740
atcccac	cacc	atata	tgcc	cgcc	cgctcg	4800
ggcgagg	aact	ggcgg	gcat	cgac	ccaggaga	4860
ggccctcg	catgtt	tcgttgc	tgtgt	gtact	ggctgt	4920

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<211> 576  
<212> DNA  
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cgggggtcta	ggcccgatgtt	gggaccgacc	ctggatgggg	300
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gggtgtaact	acgcccacccg	gaacctgccc	ctggctcacg	480
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<210> 21  
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<212> DNA  
<213> Hepatitis C virus

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ggcagcaaga	ccctcgcccg	gccttaagggc	cccatcaccc	ccatggcgcc
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seq listing.txt

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<212> DNA

<213> Hepatitis C virus

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<210> 23

<211> 1779

<212> DNA

<213> Hepatitis C virus

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<210> 24

<211> 3010

<212> PRT

<213> Hepatitis C virus

<400> 24

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35 40 45

seq listing.txt

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 100 105 110  
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 115 120 125  
 Gly Phe Ala Asp Leu Met Gly Tyr Ile Pro Leu Val Gly Ala Pro Leu  
 130 135 140  
 Gly Gly Ala Ala Arg Ala Leu Ala His Gly Val Arg Val Leu Glu Asp  
 145 150 155 160  
 Gly Val Asn Tyr Ala Thr Gly Asn Leu Pro Gly Cys Ser Phe Ser Ile  
 165 170 175  
 Phe Leu Leu Ala Leu Leu Ser Cys Leu Thr Ile Pro Ala Ser Ala Tyr  
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 Glu Val Arg Asn Val Ser Gly Ile Tyr His Val Thr Asn Asp Cys Ser  
 195 200 205  
 Asn Ser Ser Ile Val Tyr Glu Ala Ala Asp Val Ile Met His Thr Pro  
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 225 230 235 240  
 Ala Leu Thr Pro Thr Leu Ala Ala Arg Asn Ala Ser Val Pro Thr Thr  
 245 250 255  
 Thr Ile Arg Arg His Val Asp Leu Leu Val Gly Thr Ala Ala Phe Cys  
 260 265 270  
 Ser Ala Met Tyr Val Gly Asp Leu Cys Gly Ser Ile Phe Leu Val Ser  
 275 280 285  
 Gln Leu Phe Thr Phe Ser Pro Arg Arg His Glu Thr Val Gln Asp Cys  
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 340 345 350  
 Trp Gly Val Leu Ala Gly Leu Ala Tyr Tyr Ser Met Val Gly Asn Trp  
 355 360 365  
 Ala Lys Val Leu Ile Val Ala Leu Leu Phe Ala Gly Val Asp Gly Glu  
 370 375 380  
 Thr His Thr Thr Gly Arg Val Ala Gly His Thr Thr Ser Gly Phe Thr  
 385 390 395 400  
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 420 425 430  
 Leu Gln Thr Gly Phe Phe Ala Ala Leu Phe Tyr Ala His Lys Phe Asn  
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 450 455 460  
 Phe Ala Gln Gly Trp Gly Pro Ile Thr Tyr Thr Lys Pro Asn Ser Ser  
 465 470 475 480  
 Asp Gln Arg Pro Tyr Cys Trp His Tyr Ala Pro Arg Pro Cys Gly Val  
 485 490 495  
 Val Pro Ala Ser Gln Val Cys Gly Pro Val Tyr Cys Phe Thr Pro Ser  
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 Pro Val Val Gly Thr Thr Asp Arg Ser Gly Val Pro Thr Tyr Ser  
 515 520 525  
 Trp Gly Glu Asn Glu Thr Asp Val Met Leu Leu Asn Asn Thr Arg Pro  
 530 535 540  
 Pro Gln Gly Asn Trp Phe Gly Cys Thr Trp Met Asn Ser Thr Gly Phe  
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seq listing.txt

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 625 630 635 640  
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 Arg Asp Arg Ser Glu Leu Ser Pro Leu Leu Ser Thr Thr Glu Trp  
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 Gln Ile Leu Pro Cys Ala Phe Thr Thr Leu Pro Ala Leu Ser Thr Gly  
 675 680 685  
 Leu Ile His Leu His Gln Asn Ile Val Asp Val Gln Tyr Leu Tyr Gly  
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 740 745 750  
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 785 790 795 800  
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 820 825 830  
 Pro Tyr Tyr Lys Val Phe Leu Thr Arg Leu Ile Trp Trp Leu Gln Tyr  
 835 840 845  
 Phe Ile Thr Arg Ala Glu Ala His Met Gln Val Trp Val Pro Pro Leu  
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 Asn Val Arg Gly Gly Arg Asp Ala Ile Ile Leu Leu Thr Cys Ala Val  
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 Gly Pro Leu Met Val Leu Gln Ala Gly Ile Thr Arg Val Pro Tyr Phe  
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 Ser Ala Met Glu Thr Lys Val Ile Thr Trp Gly Ala Asp Thr Ala Ala  
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 Cys Gly Asp Ile Ile Leu Gly Leu Pro Val Ser Ala Arg Arg Gly Lys  
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 Thr Leu Ala Gly Pro Lys Gly Pro Ile Thr Gln Met Tyr Thr Asn Val  
 1090 1095 1100  
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seq listing.txt

Ala Asp Val Ile Pro Val Arg Arg Arg Gly Asp Ser Arg Gly Ser Leu  
 1140 1145 1150  
 Leu Ser Pro Arg Pro Val Ser Tyr Leu Lys Gly Ser Ser Gly Gly Pro  
 1155 1160 1165  
 Leu Leu Cys Pro Ser Gly His Val Val Gly Val Phe Arg Ala Ala Val  
 1170 1175 1180  
 Cys Thr Arg Gly Val Ala Lys Ala Val Asp Phe Ile Pro Val Glu Ser  
 1185 1190 1195 1200  
 Met Glu Thr Thr Met Arg Ser Pro Val Phe Thr Asp Asn Ser Thr Pro  
 1205 1210 1215  
 Pro Ala Val Pro Gln Thr Phe Gln Val Ala His Leu His Ala Pro Thr  
 1220 1225 1230  
 Gly Ser Gly Lys Ser Thr Lys Val Pro Ala Ala Tyr Ala Ala Gln Gly  
 1235 1240 1245  
 Tyr Lys Val Leu Val Leu Asn Pro Ser Val Ala Ala Thr Leu Gly Phe  
 1250 1255 1260  
 Gly Ala Tyr Met Ser Lys Ala His Gly Ile Asp Pro Asn Ile Arg Thr  
 1265 1270 1275 1280  
 Gly Val Arg Thr Ile Thr Thr Gly Gly Ser Ile Thr Tyr Ser Thr Tyr  
 1285 1290 1295  
 Gly Lys Phe Leu Ala Asp Gly Gly Cys Ser Gly Gly Ala Tyr Asp Ile  
 1300 1305 1310  
 Ile Ile Cys Asp Glu Cys His Ser Thr Asp Ser Thr Thr Ile Leu Gly  
 1315 1320 1325  
 Ile Gly Thr Val Leu Asp Gln Ala Glu Thr Ala Gly Ala Arg Leu Val  
 1330 1335 1340  
 Val Leu Ala Thr Ala Thr Pro Pro Gly Ser Val Thr Val Pro His Pro  
 1345 1350 1355 1360  
 Asn Ile Glu Glu Ile Gly Leu Ser Asn Asn Gly Glu Ile Pro Phe Tyr  
 1365 1370 1375  
 Gly Lys Ala Ile Pro Ile Glu Ala Ile Lys Gly Gly Arg His Leu Ile  
 1380 1385 1390  
 Phe Cys His Ser Lys Lys Cys Asp Glu Leu Ala Ala Lys Leu Thr  
 1395 1400 1405  
 Gly Leu Gly Leu Asn Ala Val Ala Tyr Tyr Arg Gly Leu Asp Val Ser  
 1410 1415 1420  
 Val Ile Pro Pro Ile Gly Asp Val Val Val Val Ala Thr Asp Ala Leu  
 1425 1430 1435 1440  
 Met Thr Gly Phe Thr Gly Asp Phe Asp Ser Val Ile Asp Cys Asn Thr  
 1445 1450 1455  
 Cys Val Thr Gln Thr Val Asp Phe Ser Leu Asp Pro Thr Phe Thr Ile  
 1460 1465 1470  
 Glu Thr Thr Thr Val Pro Gln Asp Ala Val Ser Arg Ser Gln Arg Arg  
 1475 1480 1485  
 Gly Arg Thr Gly Arg Gly Arg Ser Gly Ile Tyr Arg Phe Val Thr Pro  
 1490 1495 1500  
 Gly Glu Arg Pro Ser Gly Met Phe Asp Ser Ser Val Leu Cys Glu Cys  
 1505 1510 1515 1520  
 Tyr Asp Ala Gly Cys Ala Trp Tyr Glu Leu Thr Pro Ala Glu Thr Ser  
 1525 1530 1535  
 Val Arg Leu Arg Ala Tyr Leu Asn Thr Pro Gly Leu Pro Val Cys Gln  
 1540 1545 1550  
 Asp His Leu Glu Phe Trp Glu Ser Val Phe Thr Gly Leu Thr His Ile  
 1555 1560 1565  
 Asp Ala His Phe Leu Ser Gln Thr Lys Gln Ala Gly Asp Asn Phe Pro  
 1570 1575 1580  
 Tyr Leu Val Ala Tyr Gln Ala Thr Val Cys Ala Arg Ala Gln Ala Pro  
 1585 1590 1595 1600  
 Pro Pro Ser Trp Asp Gln Met Trp Lys Cys Leu Ile Arg Leu Lys Pro  
 1605 1610 1615  
 Thr Leu His Gly Pro Thr Pro Leu Leu Tyr Arg Leu Gly Ala Val Gln  
 1620 1625 1630  
 Asn Glu Val Ile Leu Thr His Pro Ile Thr Lys Tyr Ile Met Ala Cys  
 1635 1640 1645  
 Met Ser Ala Asp Leu Glu Val Val Thr Ser Thr Trp Val Leu Val Gly  
 1650 1655 1660  
 Gly Val Leu Ala Ala Leu Ala Ala Tyr Cys Leu Thr Thr Gly Ser Val  
 1665 1670 1675 1680

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val Ile Val Gly Arg Ile Ile Leu Ser Gly Lys Pro Ala Val Val Pro  
                   1685                 1690                 1695  
 Asp Arg Glu Val Leu Tyr Gln Glu Phe Asp Glu Met Glu Glu Cys Ala  
                   1700                 1705                 1710  
 Ser Gln Leu Pro Tyr Ile Glu Gln Gly Met Gln Leu Ala Glu Gln Phe  
                   1715                 1720                 1725  
 Lys Gln Lys Ala Leu Gly Leu Leu Gln Thr Ala Thr Lys Gln Ala Glu  
                   1730                 1735                 1740  
 Ala Ala Ala Pro Val Val Glu Ser Lys Trp Arg Ala Leu Glu Thr Phe  
                   1745                 1750                 1755                 1760  
 Trp Ala Lys His Met Trp Asn Phe Ile Ser Gly Ile Gln Tyr Leu Ala  
                   1765                 1770                 1775  
 Gly Leu Ser Thr Leu Pro Gly Asn Pro Ala Ile Ala Ser Leu Met Ala  
                   1780                 1785                 1790  
 Phe Thr Ala Ser Ile Thr Ser Pro Leu Thr Thr Gln Asn Thr Leu Leu  
                   1795                 1800                 1805  
 Phe Asn Ile Leu Gly Gly Trp Val Ala Ala Gln Leu Ala Pro Pro Ser  
                   1810                 1815                 1820  
 Ala Ala Ser Ala Phe Val Gly Ala Gly Ile Ala Gly Ala Ala Val Gly  
                   1825                 1830                 1835                 1840  
 Ser Ile Gly Leu Gly Lys Val Leu Val Asp Ile Leu Ala Gly Tyr Gly  
                   1845                 1850                 1855  
 Ala Gly Val Ala Gly Ala Leu Val Ala Phe Lys Val Met Ser Gly Glu  
                   1860                 1865                 1870  
 Val Pro Ser Thr Glu Asp Leu Val Asn Leu Leu Pro Ala Ile Leu Ser  
                   1875                 1880                 1885  
 Pro Gly Ala Leu Val Val Gly Val Val Cys Ala Ala Ile Leu Arg Arg  
                   1890                 1895                 1900  
 His Val Gly Pro Gly Glu Gly Ala Val Gln Trp Met Asn Arg Leu Ile  
                   1905                 1910                 1915                 1920  
 Ala Phe Ala Ser Arg Gly Asn His Val Ser Pro Thr His Tyr Val Pro  
                   1925                 1930                 1935  
 Glu Ser Asp Ala Ala Ala Arg Val Thr Gln Ile Leu Ser Ser Leu Thr  
                   1940                 1945                 1950  
 Ile Thr Gln Leu Leu Lys Arg Leu His Gln Trp Ile Asn Glu Asp Cys  
                   1955                 1960                 1965  
 Ser Thr Pro Cys Ser Gly Ser Trp Leu Arg Asp Val Trp Asp Trp Ile  
                   1970                 1975                 1980  
 Cys Thr Val Leu Thr Asp Phe Lys Thr Trp Leu Gln Ser Lys Leu Leu  
                   1985                 1990                 1995                 2000  
 Pro Arg Leu Pro Gly Val Pro Phe Leu Ser Cys Gln Arg Gly Tyr Lys  
                   2005                 2010                 2015  
 Gly Val Trp Arg Gly Asp Gly Ile Met Gln Thr Thr Cys Pro Cys Gly  
                   2020                 2025                 2030  
 Ala Gln Ile Ala Gly His Val Lys Asn Gly Ser Met Arg Ile Val Gly  
                   2035                 2040                 2045  
 Pro Arg Thr Cys Ser Asn Thr Trp His Gly Thr Phe Pro Ile Asn Ala  
                   2050                 2055                 2060  
 Tyr Thr Thr Gly Pro Cys Thr Pro Ser Pro Ala Pro Asn Tyr Ser Arg  
                   2065                 2070                 2075                 2080  
 Ala Leu Trp Arg Val Ala Ala Glu Glu Tyr Val Glu Val Thr Arg Val  
                   2085                 2090                 2095  
 Gly Asp Phe His Tyr Val Thr Gly Met Thr Thr Asp Asn Val Lys Cys  
                   2100                 2105                 2110  
 Pro Cys Gln Val Pro Ala Pro Glu Phe Phe Thr Glu Val Asp Gly Val  
                   2115                 2120                 2125  
 Arg Leu His Arg Tyr Ala Pro Ala Cys Lys Pro Leu Leu Arg Glu Asp  
                   2130                 2135                 2140  
 Val Thr Phe Gln Val Gly Leu Asn Gln Tyr Leu Val Gly Ser Gln Leu  
                   2145                 2150                 2155                 2160  
 Pro Cys Glu Pro Glu Pro Asp Val Thr Val Leu Thr Ser Met Leu Thr  
                   2165                 2170                 2175  
 Asp Pro Ser His Ile Thr Ala Glu Thr Ala Lys Arg Arg Leu Ala Arg  
                   2180                 2185                 2190  
 Gly Ser Pro Pro Ser Leu Ala Ser Ser Ser Ala Ser Gln Leu Ser Ala  
                   2195                 2200                 2205  
 Pro Ser Leu Lys Ala Thr Cys Thr Thr His His Asp Ser Pro Asp Ala  
                   2210                 2215                 2220

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Asp Leu Ile Glu Ala Asn Leu Leu Trp Arg Gln Glu Met Gly Gly Asn  
 2225 2230 2235 2240  
 Ile Thr Arg Val Glu Ser Glu Asn Lys Val Val Ile Leu Asp Ser Phe  
 2245 2250 2255  
 Glu Pro Leu His Ala Glu Gly Asp Glu Arg Glu Ile Ser Val Ala Ala  
 2260 2265 2270  
 Glu Ile Leu Arg Lys Ser Arg Lys Phe Pro Ser Ala Leu Pro Ile Trp  
 2275 2280 2285  
 Ala Arg Pro Asp Tyr Asn Pro Pro Leu Leu Glu Ser Trp Lys Asp Pro  
 2290 2295 2300  
 Asp Tyr Val Pro Pro Val Val His Gly Cys Pro Leu Pro Pro Thr Lys  
 2305 2310 2315 2320  
 Ala Pro Pro Ile Pro Pro Arg Arg Lys Arg Thr Val Val Leu Thr  
 2325 2330 2335  
 Glu Ser Asn Val Ser Ser Ala Leu Ala Glu Leu Ala Thr Lys Thr Phe  
 2340 2345 2350  
 Gly Ser Ser Gly Ser Ser Ala Val Asp Ser Gly Thr Ala Thr Ala Leu  
 2355 2360 2365  
 Pro Asp Leu Ala Ser Asp Asp Gly Asp Lys Gly Ser Asp Val Glu Ser  
 2370 2375 2380  
 Tyr Ser Ser Met Pro Pro Leu Glu Gly Glu Pro Gly Asp Pro Asp Leu  
 2385 2390 2395 2400  
 Ser Asp Gly Ser Trp Ser Thr Val Ser Glu Glu Ala Ser Glu Asp Val  
 2405 2410 2415  
 Val Cys Cys Ser Met Ser Tyr Thr Trp Thr Gly Ala Leu Ile Thr Pro  
 2420 2425 2430  
 Cys Ala Ala Glu Glu Ser Lys Leu Pro Ile Asn Pro Leu Ser Asn Ser  
 2435 2440 2445  
 Leu Leu Arg His His Asn Met Val Tyr Ala Thr Thr Ser Arg Ser Ala  
 2450 2455 2460  
 Ser Leu Arg Gln Lys Lys Val Thr Phe Asp Arg Leu Gln Val Leu Asp  
 2465 2470 2475 2480  
 Asp His Tyr Arg Asp Val Leu Lys Glu Met Lys Ala Lys Ala Ser Thr  
 2485 2490 2495  
 Val Lys Ala Lys Leu Leu Ser Ile Glu Glu Ala Cys Lys Leu Thr Pro  
 2500 2505 2510  
 Pro His Ser Ala Lys Ser Lys Phe Gly Tyr Gly Ala Lys Asp Val Arg  
 2515 2520 2525  
 Asn Leu Ser Ser Arg Ala Val Asn His Ile Arg Ser Val Trp Glu Asp  
 2530 2535 2540  
 Leu Leu Glu Asp Thr Glu Thr Pro Ile Asp Thr Thr Ile Met Ala Lys  
 2545 2550 2555 2560  
 Ser Glu Val Phe Cys Val Gln Pro Glu Lys Gly Gly Arg Lys Pro Ala  
 2565 2570 2575  
 Arg Leu Ile Val Phe Pro Asp Leu Gly Val Arg Val Cys Glu Lys Met  
 2580 2585 2590  
 Ala Leu Tyr Asp Val Val Ser Thr Leu Pro Gln Ala Val Met Gly Ser  
 2595 2600 2605  
 Ser Tyr Gly Phe Gln Tyr Ser Pro Lys Gln Arg Val Glu Phe Leu Val  
 2610 2615 2620  
 Asn Thr Trp Lys Ser Lys Lys Cys Pro Met Gly Phe Ser Tyr Asp Thr  
 2625 2630 2635 2640  
 Arg Cys Phe Asp Ser Thr Val Thr Glu Ser Asp Ile Arg Val Glu Glu  
 2645 2650 2655  
 Ser Ile Tyr Gln Cys Cys Asp Leu Ala Pro Glu Ala Arg Gln Ala Ile  
 2660 2665 2670  
 Arg Ser Leu Thr Glu Arg Leu Tyr Ile Gly Gly Pro Leu Thr Asn Ser  
 2675 2680 2685  
 Lys Gly Gln Asn Cys Gly Tyr Arg Arg Cys Arg Ala Ser Gly Val Leu  
 2690 2695 2700  
 Thr Thr Ser Cys Gly Asn Thr Leu Thr Cys Tyr Leu Lys Ala Thr Ala  
 2705 2710 2715 2720  
 Ala Cys Arg Ala Ala Lys Leu Gln Asp Cys Thr Met Leu Val Asn Gly  
 2725 2730 2735  
 Asp Asp Leu Val Val Ile Cys Glu Ser Ala Gly Thr Gln Glu Asp Ala  
 2740 2745 2750  
 Ala Ala Leu Arg Ala Phe Thr Glu Ala Met Thr Arg Tyr Ser Ala Pro  
 2755 2760 2765

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Pro Gly Asp Pro Pro Gln Pro Glu Tyr Asp Leu Glu Leu Ile Thr Ser  
2770 2775 2780  
Cys Ser Ser Asn Val Ser Val Ala His Asp Ala Ser Gly Lys Arg Val  
2785 2790 2795 2800  
Tyr Tyr Leu Thr Arg Asp Pro Thr Thr Pro Leu Ala Arg Ala Ala Trp  
2805 2810 2815  
Glu Thr Ala Arg His Thr Pro Ile Asn Ser Trp Leu Gly Asn Ile Ile  
2820 2825 2830  
Met Tyr Ala Pro Thr Leu Trp Ala Arg Met Ile Leu Met Thr His Phe  
2835 2840 2845  
Phe Ser Ile Leu Leu Ala Gln Glu Gln Leu Glu Lys Ala Leu Asp Cys  
2850 2855 2860  
Gln Ile Tyr Gly Ala Cys Tyr Ser Ile Glu Pro Leu Asp Leu Pro Gln  
2865 2870 2875 2880  
Ile Ile Glu Arg Leu His Gly Leu Ser Ala Phe Thr Leu His Ser Tyr  
2885 2890 2895  
Ser Pro Gly Glu Ile Asn Arg Val Ala Ser Cys Leu Arg Lys Leu Gly  
2900 2905 2910  
Val Pro Pro Leu Arg Thr Trp Arg His Arg Ala Arg Ser Val Arg Ala  
2915 2920 2925  
Lys Leu Leu Ser Gln Gly Gly Arg Ala Ala Thr Cys Gly Arg Tyr Leu  
2930 2935 2940  
Phe Asn Trp Ala Val Arg Thr Lys Leu Lys Leu Thr Pro Ile Pro Ala  
2945 2950 2955 2960  
Ala Ser Gln Leu Asp Leu Ser Gly Trp Phe Val Ala Gly Tyr Ser Gly  
2965 2970 2975  
Gly Asp Ile Tyr His Ser Leu Ser Arg Ala Arg Pro Arg Trp Phe Pro  
2980 2985 2990  
Leu Cys Leu Leu Leu Ser Val Gly Val Gly Ile Tyr Leu Leu Pro  
2995 3000 3005  
Asn Arg  
3010